Quality Assurance Project Plan

Homestake Mining Company Superfund Site
Grants, New Mexico

Prepared 07 May 2010

Last Revised 31 Aug 2010

Prepared for EPA Region Six

Prepared by USACE Kansas City District
Hazardous, Toxic, and Radioactive Waste Program
Radiation Safety Support Team

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QAPP Worksheet #1
(UFP-QAPP Manual Section 2.1)
Title and Approval Page

Site Name/Project Name: Homestake Uranium Mine
Site Location: Grants, New Mexico

Document Title - Homestake Mine Sampling Investigation Quality Assurance Project Plan

Lead Organization- US EPA Region Six

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Preparation Date (Day/Month/Year) – 05 May 2010

Investigative Organization's Project Manager:

Signature

Printed Name/Organization/Date

Investigative Organization's Project QA Officer:

Signature

___ Printed Name/Organization/Date

Lead Organization's Project Manager:

Signature

___ Printed Name/Organization/Date

Laboratory Project Manager:

Signature

___ Printed Name/Organization/Date

Approval Signatures:

Signature

Printed Name/Organization/Date

QAPP Worksheet #2
(UFP-QAPP Manual Section 2.2.4)
QAPP Identifying Information

1. Identify guidance used to prepare QAPP: Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Manual (505-B-04-900A), USACE Requirements for the Preparation of Sampling and Analysis Plans (USACE EM-200-1-3)

2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act

3. Identify approval entity: USA EPA Region Six

4. Indicate whether the QAPP is a generic or a project-specific QAPP: This is a project specific QAPP

5. List dates of scoping sessions that were held: Not applicable

6. List dates and titles of QAPP documents written for previous site work, if applicable:

   Not Applicable

7. List organizational partners (stakeholders) and connection with lead organization:

US EPA Region Six, USACE Kansas City, Homestake Mining Company, ATSDR

8. List data users: US EPA, USACE, ATSDR, Homestake Mining Co.

9. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusion below:

_____
_____

Identify where each required QAPP element is located in the QAPP (provide section, worksheet, table, or figure number) or other project planning documents (provide complete document title, date, section number, page numbers, and location of the information in the document). Circle QAPP elements and required information that are not applicable to the project. Provide an explanation in the QAPP.

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Project Management and Objectives		
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications Table - Special Personnel Training Requirements Table	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria Table	11 12
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table	13
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation Table - Project Schedule/Timeline Table	14 15 16

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Measurement/Data Acquisition		
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/ SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Sampling SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References Table - Analytical Instrument Calibration Table - Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	23 24 25
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples Table - Screening/Confirmatory Analysis Decision Tree	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records Table - Analytical Services Table - Data Management SOPs	29 30
Assessment/Oversight		

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table	31 32
4.2 QA Management Reports	- QA Management Reports Table	33
Data Review		
5.1 Overview		
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process Table - Validation (Steps IIa and IIb) Process Table - Validation (Steps IIa and IIb) Summary Table - Usability Assessment	34 35 36 37

QAPP Worksheet #3
(UFP-QAPP Manual Section 2.3.1)
List those entities to who copies of the approved
QAPP, subsequent QAPP revisions, addenda, and amendments.

Distribution List

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Sai Appaji	Remedial Manager	EPA	(214) 665-3126			
Ghassan Khoury	Risk Assessor	EPA	(214) 665-8515			

QAPP Worksheet #4
(UFP-QAPP Manual Section 2.3.2)
Have copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the QAPP and will perform the tasks as described. Ask each organization to forward signed sheets to the central project file.

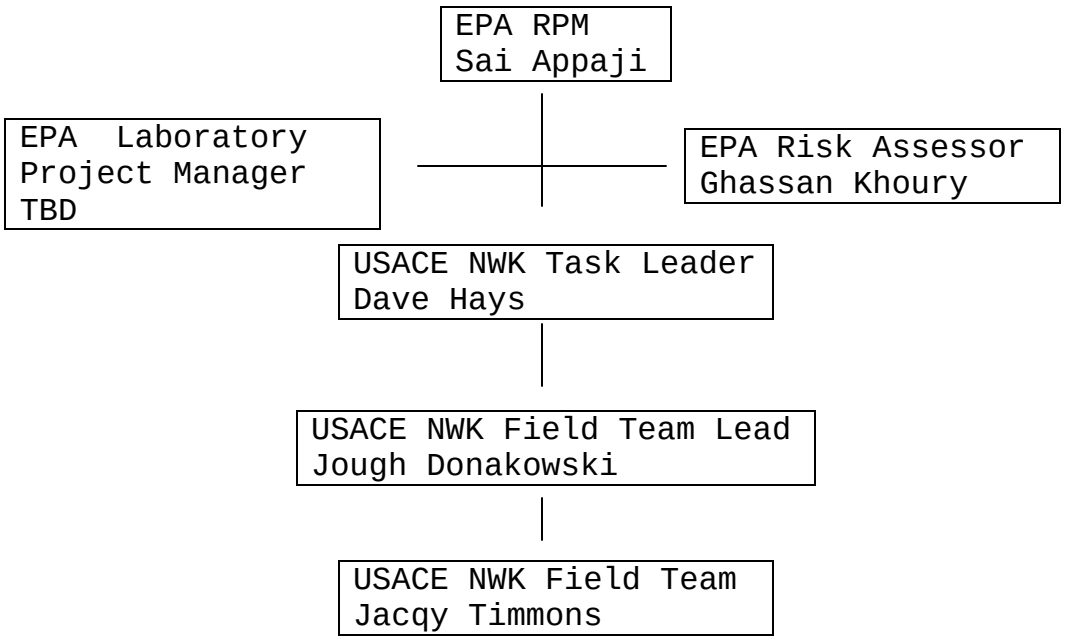
Project Personnel Sign-Off Sheet

Organization: USACE Kansas City

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Jough Donakowski	Health Physicist	(816) 389-3993		
David Hays	Health Physicist	(816) 585-5110		
Jacqy Timmons	Chemist	(816) 389-3277		

QAPP Worksheet #5
(UFP-QAPP Manual Section 2.4.1)
Identify reporting relationships between all organizations involved in the project, including the lead organization and all contractor and subcontractor organizations. Identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and/or project contacts for each organization.

Project Organizational Chart



QAPP Worksheet #6
(UFP-QAPP Manual Section 2.4.2)
Describe the communication pathways and modes of communication that will be used during the project, after the QAPP has been approved. Describe the procedures for soliciting and/or obtaining approval between project personnel, between different contractors, and between samplers and laboratory staff. Describe the procedure that will be followed when any project activity originally documented in an approved QAPP requires real-time modification to achieve project goals or a QAPP amendment is required. Describe the procedures for stopping work and identify who is responsible.

Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Point of Contact with EPA PM	EPA Project Manager (PM)	Sai Appaji	(214) 665-3126	Project deliverables will be forward to EPA PM by USACE
Oversee project quality systems and client satisfaction	USACE Task Lead	Dave Hays	(816) 585-5110	Notify EPA of field issues potentially impacting quality and the reasons within 1
QAPP changes in the field	USACE Field Team	Jough Donakowski	(816) 389-3993	Notify EPA of field issues potentially impacting quality and the reasons within 1 business day
Daily Field Progress Reports	USACE Field Team	Jough Donakowski	(816) 389-3993	USACE will provide daily quality control report to EPA

Reporting Lab Data Quality Issues	Laboratory Project Manager	TBD		All quality issues will be reported by Lab Manager to PM within 2 business days
Field and Analytical Corrective Actions	USACE Task Lead	Dave Hays	(816) 585-5110	The need for corrective action for field and analytical issues will be determined by USACE Task Lead

QAPP Worksheet #7
(UFP-QAPP Manual Section 2.4.3)
Identify project personnel associated with each organization, contractor, and subcontractor participating in responsible roles. Include data users, decision-makers, project managers, QA officers, project contacts for organizations involved in the project, project health and safety officers, geotechnical engineers and hydrogeologists, field operation personnel, analytical services, and data reviewers. Identify project team members with an asterisk (*). Attach resumes to this worksheet or note the location of the resumes.

Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Jough Donakowski	Health Physicist	USACE	Work plan development and field effort direction	
David Hays	Health Physicist	USACE	Overall task coordination and project quality assurance	
Jacqy Timmons	Chemist	USACE	Chemist support and field team member	
Sai Appaji	Remediation Manager	USEPA	EPA project coordination	
Ghassan Khoury	Risk Assessor	USEPA	EPA project coordination	

QAPP Worksheet #8
(UFP-QAPP Manual Section 2.4.4)
Provide the following information for those projects requiring personnel with specialized training. Attach training records and/or certificates to the QAPP or note their location.

No specialized training is required for this effort.

Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates[1]

[1]If training records and/or certificates are on file elsewhere, document their location in this column. If training records and/or certificates do not exist or are not available, then this should be noted.

QAPP Worksheet #9
(UFP-QAPP Manual Section 2.5.1)
Complete this worksheet for each project scoping session held.
Identify project team members who are responsible for planning the project.

All project scoping sessions were held prior to plan development

Project Scoping Session Participants Sheet

Project Name: Homestake Mining Company **Projected Date(s) of Sampling Spring 2010** **Project Manager Sai Appaji**	**Site Name Homestake Uranium Mine** **Site Location Grants, New Mexico**

Date of Session:
Scoping Session Purpose:

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Sai Appaji	RPM	USEPA			RPM
Ghassan Khoury	Risk Assessor	USEPA			Risk Assessor
Jough Donakowski	Health Physicist	USACE			Health Physicist
Dave Hays	Health Physicist	USACE			Health Physicist

Comments/Decisions:_____

_____

Action Items: _____

_____

Consensus Decisions: _____

_____

QAPP Worksheet #10
(UFP-QAPP Manual Section 2.5.2)
Clearly define the problem and the environmental questions that should be answered for the current investigation and develop the project decision "If..., then..." statements in the QAPP, linking data results with possible actions. The prompts below are meant to help the project team define the problem. They are not comprehensive.

Problem Definition

The problem to be addressed by the project:
The objective of this plan is to define activities required to complete characterization activities at the Homestake CERCLA Site.

The environmental questions being asked:
The site investigation activities will provide site investigation data of sufficient quality and quantity to prepare a preliminary Human Health Risk Assessment, facilitate EPA decisions regarding future work at the Site, and further delineate the nature and extent of potential radiological contamination.

Observations from any site reconnaissance reports:
Past environmental sampling efforts will be referenced prior to survey activities to identify potential areas of concern

A synopsis of secondary data or information from site reports:
The Homestake Mining Company uranium mill, which opened in 1958, is located 5.5 miles north of the Village of Milan in northwest New Mexico. For approximately 30 years, Homestake milled uranium at the site.

In 1958, milling operations began at Homestake's mill site. The operations involved the use of an alkaline leach-caustic precipitation process to extract and concentrate uranium oxide from uranium ores. The byproducts (waste) were either disposed above ground in the two tailings impoundments or recycled back into the milling process.

Homestake began a state-approved groundwater restoration program in 1977. The program consists of a groundwater collection/injection system for the San Mateo alluvial aquifer and the Upper and Middle Chinle aquifers.

The possible classes of contaminants and the affected matrices:
The radionuclides of potential concerns (ROPCs) at the Homestake site are Radium-226 (226Ra), Thorium-232 (232Th), Radium 228 (228Ra), and natural uranium, consisting of Uranium-234 (234U), Uranium-235 (235U, and Uranium-238 (238U), as well as Radon-222 (222Rn), Lead-210 (210Pb) and their associated daughter products. The chemicals of potential concern are TAL Metals, primarily Selenium, Molybdenum, Vanadium, Lead and Arsenic

The rationale for inclusion of chemical and nonchemical analyses:
Data will be collected to protect health and safety as well as to characterize IDW for final disposition.

Project decision conditions ("If..., then..." statements):
If COCs are determined by the Risk Assessment to significantly impact the site, additional investigation and potential remedial action may be necessary in select locations

QAPP Worksheet #11
(UFP-QAPP Manual Section 2.6.1)
Use this worksheet to develop project quality objectives (PQOs) in terms of type, quantity, and quality of data determined using a systematic planning process. Provide a detailed discussion of PQOs in the QAPP. List the PQOs in the form of qualitative and quantitative statements. These statements should answer questions such as those listed below. These questions are examples only, however; they are neither inclusive nor appropriate for all projects.

Who will use the data?
The EPA and ATSDR will use the data to perform a Human Health Risk assessment and support future project decisions

What will the data be used for?
The data will be used to determine the nature and extent of contamination in various areas at the site and to support potential future remedial efforts.

What types of data are needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques)
The data will be used to determine the nature and extent of radiological and chemical contamination in soils at the site and to support a human health risk assessment and potential future remedial efforts. In general, the required sampling will consist of measurements of surface gamma exposure rates, indoor radon concentrations, surface alpha/beta activities, concentrations of radionuclides and chemical parameters in soil and water, and physical and chemical properties of the soil (e.g. moisture and porosity).

How "good" do the data need to be in order to support the environmental decision?
The quantity and the quality of the sampling data should allow Homestake material to be distinguished from background and to provide data for a defensible Human Health Risk Assessment (HHRA), for H&S data to distinguish from OSHA action levels, and for IDW characterization to be approvable by a landfill

How much data are needed? (number of samples for each analytical group, matrix, and concentration)

Matrix	Samples	QC	MS	Total

Background Surface Soil	30	3	2	35
Background Subsurface Soil	28	3	2	33
Background Residential Water	10	1	1	12
Background Residential Radon (Charcoal Canisters)	60	6	NA	66
Background Indoor/Outdoor Radon (Alpha Track Etch Detectors)	60	6	NA	66
Residential Surface Soil	73	8	4	85
Residential Subsurface Soil	40	4	2	46
Residential Soil Gas	12	2	1	15
Vegetation	25	3	2	30
Irrigation Area Surface Soil	20	2	1	23
Irrigation Area Subsurface Soil	20	2	1	23
Residential Water	14	2	1	17
Animal water tanks	Up to 10	1	1	12
Evaporation pond water	Up to 10	1	1	12
Residential Radon (Charcoal Canisters)	80	8	NA	88
Indoor/Outdoor Radon (Alpha Track Etch Detectors)	80	8	NA	88
Spray Film	TBD	TBD	TBD	TBD
Total				**651**

Where, when, and how should the data be collected/generated?

Samples will be collected according to Section 5 outlined in the FSP. Sample collection will be performed in the late late summer/early fall of 2010.

Who will collect and generate the data?

USACE Kansas City will perform sample collection and preliminary data reporting.

How will the data be reported?

A Draft Completion Report will be prepared that discusses the results of the soil sampling results collected, including the nature and the extent of soil contamination. Electronic deliverables from the laboratory will be transmitted with the final data package for each sampling event on electronic storage media, or via e-mail if pre-arranged. The data will be provided in an electronic data deliverable (EDD) format for all field samples and laboratory QA/QC samples. All EDD files will be submitted in ASCII, tab-delimited file format so that the data may be uploaded to the selected data management and review software system, or exported to the web-site or specific EDD formats, to include Microsoft Excel spreadsheets, as necessary. The file will contain data for one and only one sample delivery group.

How will the data be archived?

The Field Supervisor shall maintain records for the duration of the project at the project site. Upon return to the location of record management, the records shall be maintained in a fashion such that they are protected from loss or damage. Record storage shall be in accordance with federal regulations.

QAPP Worksheet #12
(UFP-QAPP Manual Section 2.6.2)
Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQIs), measurement performance criteria (MPC), and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for a specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Measurement Performance Criteria Table

Matrix	Soil
Analytical Group	ROPCs
Concentration Level	Low

Sampling Procedure1	Analytical Method/SOP2	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
Offsite Analyses	Ra-226 - EPA 901.1m Pb-214 - EPA 901.1m Bi-214 - EPA 901.1m K-40 - EPA 901.1m Ac-228 - EPA 901.1m Th-234 - EPA 901.1m	Precision	RPD <50	Field DUP	A
		Precision	NAD <1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A

Matrix	Soil
Analytical Group	ROPCs
Concentration Level	Low

Sampling Procedure1	Analytical Method/SOP2	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	U-235 - EPA 901.1m Isotopic Thorium (230, 232, 234) and Uranium (234, 235, 238) - ASTM D3972-90M	Completeness	90%	Data Completeness Check	S & A

[1]If information varies within an analytical group, separate by individual analyte.
[2]Reference number from QAPP Worksheet #21 (see Section 3.1.2).
[3]Reference number from QAPP Worksheet #23 (see Section 3.2).

Matrix	Soil
Analytical Group	TAL Metals
Concentration Level	Low

Sampling Procedure[1]	**Analytical Method/SOP**[2]	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Offsite Analyses	TAL Metals - EPA ISMO1.2	Precision	RPD <30	Field DUPs	A
		Precision	NAD < 1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A
		Completeness	90%	Data Completeness Check	S & A

Matrix	Groundwater Characteristics
Analytical Group	Radiological
Concentration Level	Low

Sampling Procedure[1]	**Analytical Method/SOP**[2]	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Offsite Analyses	Ra-226 - Eichrom Ra-228 - EPA 904.0 Isotopic Thorium (Th-232) and Uranium (234, 235, 238) - ASTM D3972-90M Rn-222 Gross Alpha/Gross Beta	Precision	RPD <30	Field DUPs	A
		Precision	NAD < 1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A
		Completeness	90%	Data Completeness Check	S & A

Matrix	Groundwater Characteristics
Analytical Group	TAL Metals
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
Offsite Analyses	TAL Metals - EPA ISMO1.2	Precision	RPD <30	Field DUPs	A
		Precision	NAD < 1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A
		Completeness	90%	Data Completeness Check	S & A

Matrix	Vegetations Samples
Analytical Group	Radiological
Concentration Level	Low

Sampling Procedure[1]	**Analytical Method/SOP[2]**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Offsite Analyses	Ra-226 - EPA 901.1m Pb-214 - EPA 901.1m Bi-214 - EPA 901.1m K-40 - EPA 901.1m Ac-228 - EPA 901.1m Th-234 - EPA 901.1m U-235 - EPA 901.1m Isotopic Thorium (230, 232, 234) and Uranium (234, 235, 238) - ASTM D3972-90M	Precision	RPD <30	Field DUPs	A
		Precision	ND<1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A
		Completeness	90%	Data Completeness Check	S & A

Matrix	Vegetations Samples
Analytical Group	TAL Metals
Concentration Level	Low

Sampling Procedure[1]	**Analytical Method/SOP[2]**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Offsite Analyses	TAL Metals - EPA ISMO1.2	Precision	RPD <30	Field DUPs	A
		Precision	ND<1.96	Lab DUPs	A
		Accuracy/Bias	Recovery (80-120)%	LCS and MS	A
		Completeness	90%	Data Completeness Check	S & A

QAPP Worksheet #13

(UFP-QAPP Manual Section 2.7)

Identify all secondary data and information that will be used for the project and their originating sources. Specify how the secondary data will be used and the limitations on their use.

Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
Air data	Semi-Annual Environmental Monitoring Reports (2006-2009)	Homestake Mining Co., particulates, radon gas and direct radiation (2006 to 2009)	Understanding historical and current levels of radiation exposure	Data will be used as a reference on levels of PROCs in air. Data could also be used to run Time trend analysis.
Soil and hay in irrigated areas	Irrigation with alluvial ground water Reports (2008 and 2009)	Homestake Mining Co., soil, irrigation water and Hay (2001 to 2008)	Understand impact of irrigation using Contaminated water on soil and hay.	Understand expected concentration ranges in media. Run Time trend analysis on data.

Water	Private wells and water from evaporation ponds	Homestake Mining Co.	Understand level of RPOCs in water used for irrigating garden vegetables and for domestic animals use.	Indirect exposure to COCs in gardens vegetables and in meat and milk of cattle raised on contaminated grazing land.

QAPP Worksheet #14
(UFP-QAPP Manual Section 2.8.1)
Provide a brief overview of the listed project activities.

Summary of Project Tasks

Sampling Tasks:

Background and Reference Areas
An appropriate background location for gamma scanning away from the spray mist will be determined during the initial site visit. The location of the background area will be clearly noted in project records for future reference.

Walkover surveys will be performed in the area that will be used to perform surface surveys at residential locations, described below in order to determine the background range for the region. A background value near the upper end of the background range will be used in calculations to determine the instrument Scan Sensitivity.

At least ten static measurements will be taken in the background area and the largest value in the background range will be used in calculations to determine the instrument Critical Level.

A total of eight background soil samples will be collected from the background area at locations considered similar to the soils that will be sampled from the residential areas. This represents approximately 10% of the planned number of soil samples to be collected during this event. Additional background soil samples may be collected if the field survey team deems it necessary. The process for collecting soil samples is described in the Soil Sampling section below.

A background or reference community such that of Crownpoint, New Mexico that resembles or have similar characteristics to the Homestake subdivision communities with houses built on similar Uranium geological features but was never mined will be identified. Surface

and sub-surface soil samples, water from private wells, indoor and outdoor radon gas and progeny will be sampled.

Sampling Procedures
EPA Region 6 has developed a Conceptual Site Model and the Visual Sampling Plan model was used to calculate number of samples needed.

At least 10% of locations sampled will also be selected for QA/QC samples. This will require a duplicate sample taken from the sample location. QA/QC sample locations will be identified by the field team during the sampling effort. At least one duplicate sample will be collected for each media to be sampled.

At least 5% of locations sampled will also be selected for MS samples. This will require one duplicate sample taken from the sample location. MS sample locations will be identified by the field team during the sampling effort. At least one MS sample will be collected for each media to be sampled.

Soil Sampling
A sampling team member will scrape up a soil sample from each sample locations using a dedicated stainless steel scoop; the appropriate volume from each location shall be placed into a stainless steel mixing bowl where gravel and foreign matter will be discarded. The sampling team member will use the spoon to thoroughly homogenize the sample material. The homogenized sample will be transferred directly into designated sample containers until the container is packed full.

Once a sufficient volume had been recovered, the sample container will be sealed, labeled, and placed into a sample shipping cooler. Clean Nitrile gloves will be worn by all personnel handling the samples.

Soil Sample Locations
Prior to residential survey and sampling efforts, EPA Region 6 will provide a map with the locations and addresses along with Rights-of-Entry (ROEs) to the USACE survey team.

Approximately 73 soil samples will be taken in residential areas near the Homestake Mill. A total of 53 samples will be collected randomly in residential areas, and twenty judgmental samples will be taken from areas where ground water was used for irrigation. Judgmental samples may be taken from areas where surface scans indicate elevated readings or from locations determined to be likely locations for contamination. Forty subsurface soil samples collected from 0-6’’,6-12’’, 12’’-18’’,18’’-24’’ and tested for all COCs will be collected along surface soil that show high scan readings.

Approximately twenty five soil samples will be collected from the center pivot and flood irrigation areas. The locations of these samples will be based on results from the ERGS surface gamma scan, gamma walkover surveys performed, and professional judgment. Twenty samples will be collected from the surface (0-6’’ BGS) and twenty samples will be collected from the subsurface (>6’’ BGS). Samples collected from the subsurface will be sampled using a hand-auger. The hand-auger will be decontaminated between uses.

About 30 surface soil samples will be collected from the background area residential yards where scans show high reading and 28 sub-surface samples will also be collected in the same procedure as is done for HMC communities.

Vegetation Sampling
Approximately twenty five vegetable and alfalfa samples will be collected from area residential gardens and irrigation areas. A sampling team member will remove the required amount of vegetable or alfalfa material from the identified area. The sample will be transferred directly into designated sample containers.

Once a sufficient volume had been recovered, the sample container will be sealed, labeled, and placed into a sample shipping cooler. Clean Nitrile gloves will be worn by all personnel handling the samples.

Vegetation Sample Locations
Gardens that are sampled will be those that use or have used groundwater for irrigation. Sample locations will be chosen in patches that will be representative of the garden and that will be minimally intrusive to the garden’s owner.

Once a sufficient volume had been recovered, the sample container will be sealed, labeled, and placed into a sample shipping cooler. Clean Nitrile gloves will be worn by all personnel handling the samples.

Water Sampling

Fourteen garden hose water samples from residents that use ground water for irrigation will be collected. One water sample will be taken from any waters bins used by domestic animals (cattle, horses or goats) encountered during the survey. A maximum of ten water bin samples will be collected during this survey. Water samples from any evaporation pond encountered will also be sampled. A maximum of ten evaporation pond samples will be collected.

For samples collected from residential garden hoses, a sampling team member will draw an appropriate amount of water from the hose, allowing the hose to run for several seconds before collecting the sample to allow for any residual water in the hose to be removed. Once a sufficient volume had been recovered, the sample container will be sealed, labeled, and placed into a sample shipping cooler. Clean Nitrile gloves will be worn by all personnel handling the samples.

For samples taken from water bins and evaporation ponds, stainless steel measuring cups or other similar containers will be used to draw sample water from the area. Once a sufficient volume had been recovered, the sample container will be sealed, labeled, and placed into a sample shipping cooler. Clean Nitrile gloves will be worn by all personnel handling the samples.

Water from private wells in the background community will be collected in the same procedure as it is for Homestake communities.

Water Sample Locations

Water samples from garden hoses, water bins, and evaporation ponds will be taken from locations that currently or historically have used groundwater domestically or for irrigation or other agricultural purposes.

Radon Sampling
Radon canisters will be placed in approximately 80-145 homes. Large homes and multistory homes may receive multiple canisters. Additional homes may be selected as background locations. The maximum number of canister samples planned for this survey event is 271.

Around 60 homes in a background community will also receive radon canisters. Radon progeny samplers will also accompany the radon canisters to measure radon progeny in working levels (WL). Working level monitors will be placed in the same residences that receive radon canisters. The battery operated working level monitors will be placed 3 to 6 feet high in a room and run for a minimum of 24 hours. Alpha etch track detectors will also be placed in the same residences that received radon canisters. Etch track detectors will be collected quarterly for one year. A site specific equilibrium factor between Rn-222 and its progeny will be developed.

Radon Sample Locations
Canisters will be strategically placed inside the house to determine radon gas emitted from ground water used for domestic purposes such as showering, cooking, washing,swamp coolers etc. Some canisters will be placed on the outside next to the entrance door to try to distinguish between indoor and outdoor sources. Canister locations will be recorded in order to facilitate recovery.

Etch track detectors in sets of three will be placed along a straight line North East of Homestake down to Homestake subdivision communities. Around 10 stations will be selected. Etch track detectors will be placed in the residential yards of houses closest to the fence line with HMC site. About 12 residential yards. Will place one pole in the yard and have two etch tracks nailed to it. One etch track placed at 6″ off the ground and another at 5.5 feet off the ground to differentiate between air and soil radon sources.

Film Sampling
The Community is concerned that spray mist is blowing from the evaporation ponds onto residential property. The residents are reporting a film being deposited onto cars and

request sampling to be conducted in the area affected by the spray. When possible, a wipe sample will be taken of the film by wiping a wipe filter across approximately 100 cm^2 of the deposited film. These wipe samples will be sent to the contract laboratory for counting by Liquid Scintillation Counting or an equivalent counting method. The film will then be scraped and enough sample collected to run COC analysis on it and attempt to characterize it.

Film Sample Locations

Location of spray mist film deposit samples will be identified by the field team during other survey efforts and documented in the field log book.

Analysis Tasks:

Walkover surveys will be performed using 2" x 2" NaI detectors, the results of which will be logged in field logbooks and data sheets. Results of these surveys will be used to guide the sampling process.

Quality Control Tasks: 10% Field duplicates and 5% matrix spikes will be collected as a part of the Quality Assurance/Quality Control (QA/QC) samples during surface soil sampling event from the Site.

Data Management Tasks:.

1. The review of offsite analytical sampling results are performed at all levels. The individual analyst constantly reviews the quality of data through calibration checks, QC sample results and performance evaluation samples. The laboratory manager will review data for reasonableness and consistently with other generated data to determine whether program requirements have been satisfied before submitting the data report.

2. Analytical results will be reported by the laboratory in data packages presented in both hard copy and electronic format. The reports will consist of a presentation of raw analytical data, summarizes of the review and verification effort. Data packages will contain the final results, analytical methods, detection limits, surrogate recovery data, and results of QC samples (where applicable). The data packages will be prepared by the offsite laboratories in accordance with USEPA Region 6 policies, guidelines, and format.

The laboratory is also responsible for reviewing the electronic data deliverable (EDD) to ensure that the electronic data summary matches the hard copy reports.

Documentation and Records:
Field, laboratory, and cartographic data generated during this project will be achieved on durable electronic media. Backup media containing databases and programs or software utilities will be maintained in a secure location.

The field and laboratory data generated during the project will be summarized in the project closure report. The report will present the findings of the characterization, and will summarize the results. The report will include a QA section that summarizes the QC sample results and the results of instrument QC checks.

Assessment/Audit Tasks: Because of the short duration of the field activities, an on-site audit will not be performed during the project.

Data Review Tasks: See Data Management Tasks section.

QAPP Worksheet #15
(UFP-QAPP Manual Section 2.8.1)
Complete this worksheet for each matrix, analytical group, and concentration level. Identify the target analytes/contaminants of concern and project-required action limits. Next, determine the quantitation limits (QLs) that must be met to achieve the project quality objectives. Finally, list the published and achievable detection and quantitation limits for each analyte.

Reference Limits and Evaluation Table

Matrix: Soil
Analytical Group: ROPCs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit or 1E-05 risk-based Concentration[3]	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Radium-226	13982-63-3	1.93 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g
Radium-228	15262-20-1	2.6 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g
Thorium-232	7440-29-1	31.0 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-234	13966-29-5	40.0 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-235	15117-96-1	2.0 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-238	24678-82-8	44.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
Th-230	15065-10-8	34.9 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g

[1]Analytical MDLs and QLs are those documented in validated methods.
[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.

[3]Risk based concentration associated with a cancer risk of 1E-05 are from the Preliminary Remediation Goals for Superfund Table.

Matrix: Vegetation
Analytical Group: ROPCs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Radium-226	13982-63-3		1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g	1.0 pCi/g
Thorium-232	7440-29-1		0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-234	13966-29-5		0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-235	15117-96-1		0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
U-238	24678-82-8		0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g
Th-234	15065-10-8		0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g	0.6 pCi/g

[1]Analytical MDLs and QLs are those documented in validated methods.
[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.

Matrix: Groundwater
Analytical Group: ROPCs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Radium-226	13982-63-3	5.0 pCi/L[3]	2 pCi/L	2 pCi/L	2 pCi/L	2 pCi/L	2 pCi/L
Radium-228		5.0 pCi/L[3]	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L
Gross α		15.0 pCi/L[3]	3 pCi/L	3 pCi/L	3 pCi/L	3 pCi/L	3 pCi/L
Gross β		50.0 pCi/L	4 pCi/L	4 pCi/L	4 pCi/L	4 pCi/L	4 pCi/L
Radon-222+D		1.26 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L
Thorium-232	7440-29-1	4.71 pCi/L[4]	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/l
U-234	13966-29-5	6.74 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/l

U-235	15117-96-1	6.84 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/l
U-238	24678-82-8	30.0 µg/L[3]	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/l
Th-234	15065-10-8	20.0 pCi/L[4]	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/L	1 pCi/l

[1]Analytical MDLs and QLs are those documented in validated methods.

[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.

[3]MCL.

4 Considered part of the gross alpha MCL.

Matrix: Soil
Analytical Group: TAL Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit Or risk-based concentration[3]	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Selenium	7782-49-2	390 mg/Kg		3.5 mg/kg	3.5 mg/kg	3.5 mg/kg	3.5 mg/kg
Molybdenum	7439-98-7	390 mg/Kg		1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg
Vanadium	7440-62-2	390 mg/Kg		5 mg/kg	5 mg/kg	5 mg/kg	5 mg/kg
Lead	7439-92-1	400 mg/Kg		1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg
Arsenic	7440-38-2	3.9 mg/Kg		1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg

[1]Analytical MDLs and QLs are those documented in validated methods.
[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.
[3]Risk based concentration non-cancer and cancer risk from Preliminary Remediation Goals Regional table.

Matrix: Vegetation
Analytical Group: TAL Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Selenium	7782-49-2			3.5 mg/kg	3.5 mg/kg	3.5 mg/kg	3.5 mg/kg
Molybdenum	7439-98-7			1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg
Vanadium	7440-62-2			5 mg/kg	5 mg/kg	5 mg/kg	5 mg/kg
Lead	7439-92-1			1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg
Arsenic	7440-38-2			1 mg/kg	1 mg/kg	1 mg/kg	1 mg/kg

[1]Analytical MDLs and QLs are those documented in validated methods.
[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.

Matrix: Groundwater
Analytical Group: TAL Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit Or risk-based concentration [3]	Project Quantitation Limit	Analytical Method[1]		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs	QLs
Selenium	7782-49-2	50 µg/L		35 ug/L	35 ug/L	35 ug/L	35 ug/L
Molybdenum[4]	7439-98-7	180 µg/L		10 ug/L	10 ug/L	10 ug/L	10 ug/L
Vanadium	7440-62-2	180 µg/L		50 ug/L	50 ug/L	50 ug/L	50 ug/L
Lead	7439-92-1	15 µg/L		10 ug/L	10 ug/L	10 ug/L	10 ug/L
Arsenic	7440-38-2	10 µg/L		10 ug/L[4]	10 ug/L	10 ug/L	10 ug/L

[1]Analytical MDLs and QLs are those documented in validated methods.
[2]Achievable MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method.
[3]Risk based concentration non-cancer and cancer risk from Preliminary Remediation Goals Regional table.
[4] Molybdenum and Arsenic values will be determined with the lab prior to sample collection.

QAPP Worksheet #16
(UFP-QAPP Manual Section 2.8.2)
List all project activities as well as the QA assessments that will be performed during the course of the project. Include the anticipated start and completion dates.

Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Draft Work plan document creation	USACE		May 7th	Draft Work plan documents	May 7th
Final Work plan document creation	USACE			Final Work plan documents	10 Days after receipt of EPA comments
Phase 1 Field Sampling Efforts	USACE	Late June/Early August	Mid to late August	Field Sampling Report	10 Days after completion of field efforts
Phase 1 Letter report Data Summary	USACE			Letter Report Data Summary	10 Days after receiving last sample analysis report prior to 21 day hold results
Phase 1 Draft final survey report	USACE			Draft Final survey report	10 Days after receiving final sample analysis results

Phase 1 Final Survey Report	USACE			Final survey report	10 Days after receipt of EPA comments
Phase 2 Field Sampling Efforts	USACE	Winter 2010		Field Sampling Report	10 Days after completion of field efforts
Phase 2 Letter report Data Summary	USACE			Letter Report Data Summary	10 Days after receiving last sample analysis report prior to 21 day hold results
Phase 2 Draft final survey report	USACE			Draft Final survey report	10 Days after receiving final sample analysis results
Phase 2 Final Survey Report	USACE			Final survey report	10 Days after receipt of EPA comments

QAPP Worksheet #17
(UFP-QAPP Manual Section 3.1.1)
Describe the project sampling approach. Provide the rationale for selecting sample locations and matrices for each analytical group and concentration level.

Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach):

An exposure conceptual site model was developed for the site. Visual Sampling Plan computer program was developed to test the null hypothesis that the site is dirty with a 95% confidence to prove otherwise. The sampling approach was designed to collect defensible data to run a human health risk assessment (HHRA) according to CERCLA guidance. EPA's 1989 Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual part A is used.

Guidance from the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) will be utilized in the design, implementation, and data interpretation for this survey effort.

The MARSSIM process was developed collaboratively by the NRC, EPA, DOE, and U.S. Department of Defense, for use in designing, implementing, and evaluating radiological surveys. This process emphasizes the use of EPA's data quality objectives (DQOs) and data quality assessment processes, along with a sound quality assurance/quality control program. The graded approach concept is also used to ensure that survey efforts are maximized in those areas where there is the highest probability for residual contamination or greatest potential for adverse impacts of contamination. Implementation of this graded approach is incorporated throughout the MARSSIM process.

The MARSSIM process also embodies flexibility to allow adaptation of guidance to be responsive to specific site situations and agency objectives and requirements

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map or Worksheet #18 for details]:

Refer to QAPP Worksheet #14 - Sampling Tasks

QAPP Worksheet #18
(UFP-QAPP Manual Section 3.1.1)
List all site locations that will be sampled and include sample ID number, If available. (Provide a range of sampling locations or ID numbers if a site has a large number.) Specify matrix and, if applicable, depth at which samples will be taken. Only a short reference for the sampling location rationale is necessary for the table. The text of the QAPP should clearly identify the detailed rationale associated with each reference. Complete all required information, using additional worksheets if necessary.

Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth (ft)	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference[1]	Rationale for Sampling Location
Background surface soil	Soil	0 – 0.5	Alpha Spectroscopy Iso U/Th	Low/ Medium	30 Samples 3 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
			Gamma Spectroscopy-U-235, Ra-226, Pb -214, Bi-214, K-40, Ac-228, and Th-234, Ra-228, and daughters				
Background subsurface soil	Soil	0.5 +	Alpha Spectroscopy Iso U/Th	Low/ Medium	28 Samples 3 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment

			Gamma Spectroscopy-U-235, Ra-226, Pb -214, Bi-214, K-40, Ac-228, and Th-234				
Surface Residential Soil Samples	Soil	0 - 0.5	Alpha Spectroscopy Iso U/Th Gamma Spectroscopy-U-235, Ra-226, Pb -214, Bi-214, K-40, Ac-228, and Th-234	Low/ Medium	74 Samples 8 Duplicates 4 MS	FSP Appendix B	Gamma survey results and judgment
Subsurface Residential Soil Samples	Soil	0.5 +	Alpha Spectroscopy Iso U/Th Gamma Spectroscopy-U-235, Ra-226, Pb -214, Bi-214, K-40, Ac-228, and Th-234	Low/ Medium	40 Samples 4 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
Surface Irrigation Area Soil Samples	Soil	0 - 0.5	Alpha Spectroscopy Iso U/Th	Low/ Medium	20 Samples 2 Duplicates 1 MS	FSP Appendix B	Gamma survey results and judgment

			Gamma Spectroscopy-Ra-226, Pb - 214, Bi-214, K-40, Ac-228, and Th-234				
Subsurface Irrigation Area Soil Samples	Soil	0.5 +	Alpha Spectroscopy Iso U/Th	Low/ Medium	20 Samples 4 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
			Gamma Spectroscopy-Ra-226, Pb - 214, Bi-214, K-40, Ac-228, and Th-234				
Surface Background Samples	Soil	0 – 0.5	TAL Metals - EPA ISMO1.2	Low	30 Samples 3 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
Subsurface Background samples	Soil	0.5 +	TAL Metals - EPA ISMO1.2	Low	28 Samples 3 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
Surface Residential Soil Samples	Soil	0 - 0.5	TAL Metals - EPA ISMO1.2	Low	73 Samples 8 Duplicates 4 MS	FSP Appendix B	Gamma survey results and judgment
Subsurface Residential Soil Samples	Soil	0.5 +	TAL Metals - EPA ISMO1.2	Low	40 Samples 4 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
Surface Irrigation Area Soil Samples	Soil	0 - 0.5	TAL Metals - EPA ISMO1.2	Low	20 Samples 2 Duplicates 1 MS	FSP Appendix B	Gamma survey results and judgment

Subsurface Irrigation Area Soil Samples	Soil	0.5 +	TAL Metals - EPA ISMO1.2	Low	20 Samples 2 Duplicates 1 MS	FSP Appendix B	Gamma survey results and judgment
Residential water samples	Water	NA	Gross Alpha, Gross Beta, Ra-226/Ra-228 - EPA 903.1 Isotopic Thorium (Th-232) and Uranium (234, 235, 238) - ASTM D3972-90M	Low	14 Samples 2 Duplicates 1 MS	FSP Appendix B	Judgment
Vegetation	Vegetation	NA	Radiological Contaminants using Gamma Spectroscopy (Ra-226, Pb - 214, Bi-214, K-40, Ac-228, and Th-234)	Low	25 Samples 3 Duplicates 2 MS	FSP Appendix B	Gamma survey results and judgment
Background alpha track etch	Radon	NA	Rn-222	Low/Medi umn	60 Samples 6 Duplicates		
Background radon charcoal canister	Radon	NA	Rn-222	Low/Medi umn	60 Samples 6 Duplicates		
Residential alpha track etch	Radon	NA	Rn-222	Low/Medi umn	80-145[2] Samples 8-15 Duplicates		

Residential radon charcoal canister	Radon	NA	Rn-222	Low/Medi umn	80-145 Samples 8-15 Duplicates		

[1]Specify the appropriate letter or number from the Project Sampling SOP References table (Worksheet #21).
[2] There are up to 145 homes to be sampled, exact number depends on rights of entry.

QAPP Worksheet #19
(UFP-QAPP Manual Section 3.1.1)
For each matrix, analytical group, and concentration level, list the analytical and preparation method/SOP and associated sample volume, container specifications, preservation requirements, and maximum holding time.

Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference 1	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
ROPCs							
Surface and Subsurface Soil/Vegetation	Alpha Spectroscopy Iso U/Th	Low/ Medium	ASTM 3972-90m	20 g	Plastic	None	6 months
	Gamma Spectroscopy- Ra-226, Pb -214, Bi-214, K-40, Ac-228, and Th-234		EPA 901.1m	600 g	Plastic	None	6 months
Groundwater	Gross Alpha and Beta	Low/ Medium	EPA 900	1 L	Plastic	HNO_3 to pH 2	6 months
	Ra-226, Ra-228		USEPA 903.1	1 L	Plastic	HNO_3 to pH 2	6 months
	Thorium - Isotopic (228, 230, 232)		ASTM D3972-90M	1 L	Plastic	HNO_3 to pH 2	6 months
	Uranium - Isotopic (233/234, 235, 238)		ASTM D3972-90M	1 L	Plastic	HNO_3 to pH 2	6 months

Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference 1	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
TAL Metals							
Surface and Subsurface Soil/Vegetation	TAL Metals	Low/ Medium	ISM01.2		Plastic	Cool, 4^0 C	14 Days
Groundwater	TAL Metals		ISM01.2		Plastic	Cool, 4^0 C	14 Days

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #20
(UFP-QAPP Manual Section 3.1.1)
Summarize by matrix, analytical group, and concentration level the number of field QC samples that will be collected and sent to the laboratory.

Field Quality Control Sample Summary Table

Matrix	Analytical Group	Samples	QC	MS	Total
Background Surface Soil	ROPCs and TAL metals	30	3	2	35
Background Subsurface Soil	ROPCs and TAL metals	28	3	2	33
Background Residential Water	ROPCs and TAL metals	10	1	1	12
Background Residential Radon (Charcoal Canisters)	Radon	60	6	NA	66
Background Indoor/Outdoor Radon (Alpha Track Etch Detectors)	Radon	60	6	NA	66
Residential Surface Soil	ROPCs and TAL metals	73	8	4	85
Residential Subsurface Soil	ROPCs and TAL metals	40	4	2	46
Residential Soil Gas	ROPCs and TAL metals	12	2	1	15
Vegetation	ROPCs and TAL metals	25	3	2	30
Irrigation Area	ROPCs and	20	2	1	23

Surface Soil	TAL metals				
Irrigation Area Subsurface Soil	ROPCs and TAL metals	20	2	1	23
Residential Water	ROPCs and TAL metals	14	2	1	17
Animal water tanks	ROPCs and TAL metals	Up to 10	1	1	12
Evaporation pond water	ROPCs and TAL metals	Up to 10	1	1	12
Residential Radon (Charcoal Canisters)[3]	Radon	80	8	NA	92
Indoor/Outdoor Radon (Alpha Track Etch Detectors)[3]	Radon	80	8	NA	92
Spray Film	ROPCs and TAL metals	TBD	TBD	TBD	TBD
Total					**651**

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).
[2]If samples will be collected at different depths at the same location, count each discrete sampling depth as a separate sampling location or station.
[3] Radon canisters and etch track detectors will be placed in all available homes (with rights of entry), thus up to 145 homes will be sampled.

QAPP Worksheet #21
(UFP-QAPP Manual Section 3.1.2)
List all SOPs associated with project sampling including, but not limited to, sample collection, sample preservation, equipment cleaning and decontamination, equipment testing, inspection and maintenance, supply inspection and acceptance, and sample handling and custody. Include copies of the SOPs as attachments or reference all in the QAPP. Sequentially number sampling SOP references in the Reference Number column. The reference number can be used throughout the QAPP to refer to a specific SOP.

Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
	Field Equipment Cleaning and Decontamination	EPA		N	
	Management of Investigation Derived Waste	EPA		N	
	Sediment Sampling	EPA		N	
	Soil Sampling	EPA		N	
	Surface Water Sampling	EPA		N	
	Wipe (Contaminated Surface) Sampling	EPA		N	
	Field Sampling Quality Control	EPA		N	

Field equipment SOPs such as for portable instruments, working level monitors, and the EPA ERGS are instrument specific and will be attached to the QAPP prior to using.

QAPP Worksheet #22
(UFP-QAPP Manual Section 3.1.2.4)
Identify all field equipment and instruments (other than analytical instrumentation) that require calibration, maintenance, testing, or inspection and provide the SOP reference number for each type of equipment. In addition, document the frequency of activity, acceptance criteria, and corrective action requirements on the worksheet.

Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
PIC, and 2x2 NaI detector (Ludlum Model 44-10, or equivalent) couples with a Ludlum Model 2221 rate meter (or equivalent) (GWS Survey and downhole logging)	1. Pre-operational Check (a) verifying status of calibration; (b) visual inspection for physical damage; (c) battery check; (d) checking of cable connection and integrity 2.Daily Background Check at the same location Daily source check per manufacturer's specification.	According to manufacturer's specification	The mean of the 20-30 source measurements will be used as benchmark for subsequent source checks.	Daily	Prior to use and at the beginning and end of each workday	Instrument background within ±3 standard deviations of the mean site background. Source checks within ±10% of the known value	Instruments with response rates outside the acceptable criteria will be removed from the service. The equipment will be sent to the manufacturer for repair and re-calibrated.	Jough Donakowski	

Battery operated **working level monitor**	1. Pre-operational Check (a) verifying status of calibration; (b) visual inspection for physical damage; (c) battery check; (d) checking of cable connection and integrity	According to manufacturer's specification	Preoperational check based on known background concentrations	Daily	Prior to use and at the beginning and end of each workday	Instrument background within ±3 standard deviations of the mean site background or according to manufacturer's specification	Instruments with response rates outside the acceptable criteria will be removed from the service. The equipment will be sent to the manufacturer for repair and re-calibrated.	Jough Donakowski	

[1]Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21).

QAPP Worksheet #23
(UFP-QAPP Manual Section 3.2.1)
List all SOPs that will be used to perform on-site or off-site analysis. Indicate whether the procedure produces screening or definitive data. Sequentially number analytical SOP references in the Reference Number column. Include copies of the SOPs as attachments or reference in the QAPP. The reference number can be used throughout the QAPP to refer to a specific SOP.

Laboratory SOPs to be provided by EPA Alabama Analytical Laboratory and will be attached.

Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)

QAPP Worksheet #24
(UFP-QAPP Manual Section 3.2.2)
Identify all analytical instrumentation that requires calibration and provide the SOP reference number for each. In addition, document the frequency, acceptance criteria, and corrective action requirements on the worksheet.

Information regarding calibration of field instrumentation to be used is included in Worksheet #22. Laboratory Analytical Instrument information will be submitted as part of the Laboratory QA report with sample analysis results.

Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #25
(UFP-QAPP Manual Section 3.2.3)
Identify all analytical instrumentation that requires maintenance, testing, or inspection and provide the SOP reference number for each. In addition, document the frequency, acceptance criteria, and corrective action requirements on the worksheet.

Information regarding calibration of field instrumentation to be used is included in Worksheet #22.

Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #26
(UFP-QAPP Manual Appendix A)
Use this worksheet to identify components of the project-specific sample handling system. Record personnel, and their organizational affiliations, who are primarily responsible for ensuring proper handling, custody, and storage of field samples from the time of collection, to laboratory delivery, to final sample disposal. Indicate the number of days field samples and their extracts/digestates will be archived prior to disposal.

Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): USACE Kansas City
Sample Packaging (Personnel/Organization): USACE Kansas City
Coordination of Shipment (Personnel/Organization): USACE Kansas City
Type of Shipment/Carrier: Overnight/Fed Ex lab provided cooler
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): EPA Alabama Lab
Sample Custody and Storage (Personnel/Organization): EPA Alabama Lab
Sample Preparation (Personnel/Organization): EPA Alabama Lab
Sample Determinative Analysis (Personnel/Organization): EPA Alabama Lab
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): All samples are kept for at least six months from the time the samples are received. After six months, the samples are disposed of unless otherwise specified by the client. Disposal of all samples must be recorded in sample disposal logbook.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): NA
Biological Sample Storage (No. of days from sample collection): NA

SAMPLE DISPOSAL
Personnel/Organization: EPA Alabama Lab
Number of Days from Analysis 28 Days

QAPP Worksheet #27
(UFP-QAPP Manual Section 3.3.3)
Describe the procedures that will be used to maintain sample custody and integrity. Include examples of chain-of-custody forms, traffic reports, sample identification, custody seals, laboratory sample receipt forms, and laboratory sample transfer forms. Attach or reference applicable SOPs.

Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

The sample packaging and shipment procedures summarized below ensure that the samples will arrive at the laboratory with the chain-of-custody intact. The field sampler will be personally responsible for the care and custody of the samples until the samples are transferred or properly dispatched. As few people as possible will handle the samples. All sample containers will be tagged or labeled with sample identification numbers and locations, including time and date of sample collection. Sample tags or labels will be completed for each sample using a permanent, waterproof ink either prior to or immediately after sample collection. The Project Manager will review all field activities to determine whether proper custody procedures were followed during the field work and decide if additional samples are required.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

Samples submitted to the Laboratory will be accompanied by a chain-of-custody form. The chain-of-custody forms will be completed and sealed within the sample transport container, which will be opened and examined by the Laboratory Sample Custodian. The Laboratory Sample Custodian will ensure that all entries on the chain-of-custody form correspond with the sample label. If discrepancies are noted by the Laboratory Sample Custodian, project staff will be contracted to resolve any conflicting information. In addition, the designated Laboratory Sample Custodian will examine the condition, preservation, and accompanying documentation of all submitted samples prior to approval

and formal acceptance by the Laboratory. Any sample, preservation, or documentation discrepancies (i.e., broken sample container, improper preservation, inadequate sample volume, or poor documentation) will be resolved before the sample is approved and formally accepted for analyses. All required acceptance data will be recorded and documented in the Laboratory Sample Log and Laboratory Computerized Data Management System. The sample will be labeled with Laboratory identification information and placed in the secure sample storage area prior to distribution to the appropriate analyst(s).

Once the sample has been officially entered into the Laboratory computer system, the computer generates individual sample sheets. These sample sheets contain all pertinent information relevant to the sample. The sample record will be put into the Sample Control Logbook, which is located in the Sample Receiving Area. The analyst(s) will sign out samples from the Sample Receiving Area by entering their initials, date, and time of sample removal into the logbook. The sample will be taken to the appropriate laboratory section and logged into the analyst's Sample Control Record. Any time the sample or extract is removed from or returned to the refrigerator, the pertinent information (analyst initials, date, and time) will be recorded into the logbook. The sample or extract will remain in the freezer until it is time to dispose of it. At that time, disposal information will also be recorded on the Sample Control Record.

Sample Identification Procedures:

A sample numbering system will be used to identify each sample collected and submitted for analysis. The purpose of this numbering system is to assist in tracking samples and facilitate retrieval of sample data. The sample identification numbers for each sampling effort will be used on sample labels, sample tracking matrix forms, chain of- custody forms, and all other applicable documentation. The sampling team leader will maintain a listing of all sample identification numbers in the field logbook. All sample containers will be labeled at the time of sampling.

Chain-of-custody Procedures:

Chain-of-custody procedures are employed to maintain and document sample possession. A

sample is considered under a person's custody if it is in that person's physical possession, within visual sight of that person after taking physical possession, secured by that person so that the sample cannot be tampered with, or secured by that person in an area that is restricted to unauthorized personnel. Chain-of-custody records completed by the sampler will accompany all shipments of samples. Each cooler will have a chain-of-custody form listing the samples in the cooler.

It is possible that more than one chain-of-custody form will be needed per cooler to list all the samples contained in the cooler. The purpose of these forms is to document the transfer of a group of samples traveling together; when the group of samples changes, a new custody record is initiated. The original chain-of-custody record always travels with the samples; the initiator of the record keeps a copy.

The following procedures will be followed when using chain-of custody record sheets:

- The originator will fill in all requested information from the sample labels.

- The person receiving custody will check the sample label and tag information against the chain-of-custody form. The person receiving custody will also check sample condition and note anything unusual under "Remarks" on the chain-of-custody form.

- The originator will sign the "Relinquished by" box and keep a copy of the chain-of custody form.
- After delivery by the commercial carrier, the person receiving custody will sign in the "Received by" box adjacent to the "Relinquished by" box (may also be filled in by recipient as "Federal Express" of other carrier name). All signatures and entries will be dated.

- When custody is transferred to the analytical laboratory, blank signature spaces may be left and the last "Received by" signature box used. Another approach is to run a line through the unused signature boxes.

- In all cases, it must be readily seen that the same person receiving custody has relinquished it to the next custodian.

- If samples are left unattended or a person refuses to sign, this will be documented and explained on the chain-of-custody form

All samples will be shipped in a sealed cooler and will be maintained at or below 4°C using cold ice packs or ice packed in freezer bags and preserved in nitric acid when required by the receiving laboratory.

QAPP Worksheet #28

(UFP-QAPP Manual Section 3.4)

Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

QC Samples Table

Matrix	Soil
Analytical Group	ROPCs
Concentration Level	Low/ Medium/
Sampling SOP	Soil Sampling
Field Sampling Organization	USACE
Analytical Organization	EPA

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicates and Matrix Spikes	Duplicates - 10% Matrix Spikes - 5%	NAD <1.96	If sufficient sample volume is available, reanalyze the affected sample.	TBD	Precision	NAD < 1.96
		Recovery (80-120)%		TBD	Accuracy/Bias	Recovery = (80-120)%

QAPP Worksheet #28 (Cont'd)

Matrix	Water
Analytical Group	ROPCs
Concentration Level	Low/Medium
Sampling SOP	**Surface Water Sampling**
Field Sampling Organization	USACE.
Analytical Organization	EPA

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicates and Matrix Sikes	Duplicates - 10%	NAD <1.96	If sufficient sample volume is available, reanalyze the affected sample.	TBD	Precision	NAD < 1.96
	Matrix Spikes - 5%	Recovery (80-120)%		TBD	Accuracy/Bias	Recovery = (80-120)%

QAPP Worksheet #28 (Cont'd)

Matrix	Vegetation
Analytical Group	ROPCs
Concentration Level	Low/Medium
Sampling SOP	
Field Sampling Organization	USACE
Analytical Organization	EPA

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicates and Matrix Sikes	Duplicates - 10%	NAD <1.96	If sufficient sample volume is available, reanalyze the affected sample.	TBD	Precision	NAD < 1.96
	Matrix Spikes - 5%	Recovery (80-120)%		TBD	Accuracy/Bias	Recovery = (80-120)%

QAPP Worksheet #29
(UFP-QAPP Manual Section 3.5.1)
Identify the documents and records that will be generated for all aspects of the project including, but not limited to, sample collection and field measurement, on-site and off-site analysis, and data assessment.

Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Field Notes Chain-of-Custody Records Air Bills Corrective Action Forms	Sample Receipt, Custody, and Tracking Records Standard Traceability Logs Equipment Calibration Logs Equipment Maintenance, Testing, and Inspection Logs Corrective Action Forms Reported Field Sample Results Sample Disposal Logs	Sample Receipt, Custody and Tracking Record Standard Traceability logs Equipment Calibration Logs Equipment Maintenance, Testing and Inspection Logs Corrective Action Forms Reported Field Sample Results QC Checks and QC Samples	Field Sampling Audit Checklists Field Audit Checklists	

	Telephone Logs	Data Package Completeness		

QAPP Worksheet #30
(UFP-QAPP Manual Section 3.5.2.3)
Identify all laboratories or organizations that will provide analytical services for the project, including on-site screening, on-site definitive, and off-site laboratory analytical work. Group by matrix, analytical group, concentration, and sample location or ID number. If applicable, identify the subcontractor laboratories and backup laboratory or organization that will be used if the primary laboratory or organization cannot be used.

Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	Radiological Contaminants Chemical	Low/ Medium	See worksheet 17		28 days	EPA Alabama Lab Cindy White (334)-270-7052	N/A
Vegetation	Radiological Contaminants Chemical	Low/ Medium	See worksheet 17		28 days	EPA Alabama Lab Cindy White (334)-270-7052	N/A
Groundwater	Radiological Contaminants Chemical	Low/ Medium	See worksheet 17		28 days	EPA Alabama Lab Cindy White (334)-270-7052	N/A

QAPP Worksheet #31
(UFP-QAPP Manual Section 4.1.1)
Identify the type, frequency, and responsible parties of
planned assessment activities that will be performed for the project.

There are currently no plans for a formal field assessment or audit by outside personnel. Dave Hays, the Project Task Lead may accompany the field team during efforts or perform field site visits to ensure the quality of field work.

An independent office of the USACE or EPA may conduct a site visit during the survey and may perform the following:

- Review of work plans and reports.
- Review survey data.
- Oversight of survey procedures, survey techniques, and accepted health physics practices.

Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)

QAPP Worksheet #32
(UFP-QAPP Manual Section 4.1.2)
For each type of assessment describe procedures for handling QAPP and project deviations encountered during the planned project assessments.

The nature of deficiencies and any corrective actions to be performed during the mobilization will be documented in the field logbook and in daily reports.

Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response

QAPP Worksheet #33
(UFP QAPP Manual Section 4.2)
Identify the frequency and type of planned QA Management Reports, the project delivery dates, the personnel responsible for report preparation, and the report recipients.

QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Field QA Reports	Daily field progress reports at delivered several times per week	N/A	USACE Field Team	EPA RPM
Laboratory QA Reports	As requested by the PM	N/A	Laboratory Manager	EPA RPM

QAPP Worksheet #34
(UFP-QAPP Manual Section 5.2.1)
Describe the processes that will be followed to verify project data.
Manual (Section 5.1). Describe how each item will be verified, when
the activity will occur, and what documentation is necessary, and identify
the person responsible. *Internal* or *external* is in relation to the data generator.

Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal. 100% of all radiological data will be reviewed and verified using the USACE's Data Verification Worksheet.	Int.	TBD

QAPP Worksheet #35
(UFP-QAPP Manual Section 5.2.2)
Describe the processes that will be followed to validate project data. Validation inputs include items such as those listed in Table 9 of the UFP-QAPP Manual (Section 5.1). Describe how each item will be validated, when the activity will occur, and what documentation is necessary and identify the person responsible. Differentiate between steps IIa and IIb of validation.

Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIb	Documentation of QC Sample Results	Establish that all QAPP required QC samples were run and met required limits	TBD
IIb	Project Quantitation Limit	All sample results met the project quantitation limit specified in the QAPP	TBD

QAPP Worksheet #36
(UFP-QAPP Manual Section 5.2.2)
Identify the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data.

Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIb	Soil	ROPCs	Low/Medium	100% of all radiological data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD
IIb	Vegetation	ROPCs	Low/Medium	100% of all radiological data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD
IIb	Water	ROPCs	Low/Medium	100% of all radiological data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD

IIb	Soil	TAL Metals	Low/Medium	100% of all chemical data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD
IIb	Soil	TAL Metals	Low/Medium	100% of all chemical data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD
IIb	Soil	TAL Metals	Low/Medium	100% of all chemical data will be validated using the Data Validation Guidance developed by the USACE, Kansas City District.	TBD

QAPP Worksheet #37
(UFP-QAPP Manual Section 5.2.3)
Describe the procedures/methods/activities that will be used to determine whether data are of the right type, quality, and quantity to support environmental decision-making for the project. Describe how data quality issues will be addressed and how limitations on the use of the data will be handled.

Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Analytical data generated for this project will be subjected to a process of data verification and review. All data packages received from the analytical laboratory were reviewed, and evaluated, verified by data management personnel. The following section of the report summarized the data usability assessment processes.

Precision

Precision will be determined through the use of site and laboratory duplicate result pairs by calculating a normalized absolute difference (NAD). The calculated NAD results will be compared to a performance criteria of less than or equal to 1.96. Calculated NAD values less than 1.96 will be considered acceptable and values greater than 1.96 will be investigated for possible discrepancies in analytical precision.

Accuracy

If the percentage recovery for the sample falls within 80 to 120%, the sample results are considered acceptable.

Completeness

For each analyte, completeness will be calculated as the number of data points for each analyte that meets the measurement performance criteria for precision, accuracy, divided by the total number of data points for each analyte. For this site, if the completeness is above 90%, the sample results are considered acceptable for use in characterization survey.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

The laboratory is responsible for following routine quality control procedures and operating the analytical systems within statistical control limits. These procedures include proper instrument maintenance, calibration and continuing calibration checks, and internal quality control sample analyses at the required frequencies. One of the additional ongoing data assessment processes is maintaining control charts for representative QC sample analyses to monitor system performance. This provides verification that the system is in statistical control, and indicates when performance problems occur, so the problems can be corrected as soon as possible.

Systematic uncertainties are attributable to actual errors in the measurement of physical quantities. All of those uncertainties contribute to the overall measurement error. However, those are independent of each other. Consequently, the individual contributions are combined as the square root of the sum of the squares. The overall measurement error result is expressed in activity unit, such as pCi/g. Overall measurement error in this project is expressed as a value at a specific confidence interval. The default convention is to provide the overall measurement error at the 2-sigma confidence interval. This asserts approximately a 95% confidence level that the actual sample is within the reported uncertainty range of the calculated results.

Identify the personnel responsible for performing the usability assessment:

Dave Hays and Jough Donakowski of USACE Kansas City will determine data usability.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

Data assessment procedures that will be performed for the project include:

- Initial review of analytical and field data for complete and accurate documentation, holding time compliance, and required frequency of QC samples;

- Calculation of DQIs (e.g., accuracy, precision, representativeness, comparability, completeness) using the appropriate QC sample results; and

- Assignment of data qualifier flags to the data as necessary to reflect limitations identified in the assessment process.

Qualified data will be discussed in the task reports, and data flags can be transmitted to users via data tables from the database and in analytical data reports.